

THE LAYING RHYTHM OF COWBIRDS

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THE remarkable observations of Walkinshaw (1949) on a female Cowbird that laid 25 eggs in one season have thrown new light on the vexed question of the laying rhythm of *Molothrus ater*. Does she lay in clutches? If so, does she lay every day? What are the intervals between sets? How many eggs are laid in one season?

The 3 females observed by Friedmann laid as follows: A, 5 eggs May 23-27, 1922; B, 5 eggs, May 27-31; C, 4 eggs, May 22-25. Bird B was collected 3 days after it had laid its fifth egg and 5 discharged egg follicles were found in its ovaries. Birds A and C remained for 3 weeks longer, but no more eggs were found. From May 31 for a month and a half "it rained more or less violently every day. As fast as nests were found, they were destroyed or washed away by the heavy rains, and, of course, it became impossible to keep any check on the actions of the Cowbirds. Over a hundred nests were lost during this period, directly or indirectly due to the stormy weather," (1929:182.)

With 3 South American species of Cowbirds, Davis, (1942) reports, "A histological study of serial sections of the entire ovary of 11 specimens of *Molothrus bonariensis* and one each of *M. rufo-axillaris* and *Agelaioides badius* shows that these species lay in clutches and that the maximum number of eggs per clutch is five."

As to my own experience with Cowbirds in Columbus, Ohio, while studying Song Sparrows, I came to the conclusion that these birds laid "three (and possibly four in some cases) 'sets' of eggs with intervals of 6 to perhaps 12 days between 'sets' . . . it may well be that an egg is sometimes held over, so that 5 eggs may be laid in 6 or 7 days," (1937:155). With 3 types of eggs I found evidence of 3 sets, with 5 types of at least 2. Of type E 5 eggs were laid in 5 days; with type G 4 (at least) were laid in 5 days; with type A 4 (at least) in 7 days.

Davis (1942:10) was adverse to the idea of a Cowbird missing a day when laying. He writes, "if we assume that each female lays only five eggs in each set and lays at daily intervals, Nice's table must be rearranged, leading to the conclusion that the interval between the clutches is as short as three days." I know of no bird having an interval between clutches of less than 5 days. With passerines 5 days is the usual interval between the destruction of one set and the start of another. Riddle (1922) found that the ovum grows very slowly most of the time, but that it "jumps in a day from its accustomed rate of in-

crease to a rate that is probably from eight to twenty times higher. . . . The time interval between the beginning of rapid growth of the 6 mm. egg [in the fowl] and the breaking of the egg from the ovarian follicle (ovulation) is normally between five and eight days."

Near his home at Battle Creek, Michigan, Walkinshaw (1949) has been making an intensive study of Field Sparrows, color-banding the breeding birds and locating every nest. Between May 5 and July 24, 1944 he found 25 eggs that he believed were laid by one Cowbird, basing this opinion on their similarity in size, shape, and color, and on the facts that all were laid in an area of 12.5 acres and that no 2 were laid on the same day. He "knew the exact date of

TABLE I
Laying Rhythm of Cowbird at Battle Creek, Michigan, 1944

| NUMBER OF DAYS | | DATES LAID | NUMBER LAID |
|----------------|--------|----------------------------|-------------|
| Non-laying | Laying | | |
| | 6 | May 15, 16, 17*, 19*, 20 | 5 |
| 5 | 5 | May 26, 29, 30 | 3† |
| 5 | 9 | June 5, 7, 10, 11, 13 | 5 |
| 4 | 6 | June 18, 19, 22, 23 | 4 |
| 6 | 1 | June 30 | 1 |
| 7 | 10 | July 8, 10, 11, 14, 16, 17 | 6 |
| 5 | 1 | July 23* | 1 |
| Total 32 | 38 | | 25 |

* See text.

† It is possible that the Cowbird laid even more than 25 eggs, as Dr. Walkinshaw writes me that he did not find all of the Towhee nests on the area, although he believes he found all the Field Sparrow nests.

laying of 19 [of the eggs] and the date within 1-2 days for 4 others." "One nest of a Towhee was parasitized and 20 nests of 14 pairs of Field Sparrows."

From Walkinshaw's table of dates of finding of the eggs I have constructed table 1 arranged to show the laying and non-laying periods in the 70 day span.

Assuming that the 2 eggs found May 25 were laid May 17 and 19 and belonged to the first clutch, and assuming that the egg found July 24 was laid July 23, rather than on the 20th as Walkinshaw suggests, then we find that the 25 eggs fall into 7 "clutches", the first 4 ranging from 3 to 5 eggs, the sixth consisting of 6 eggs, the fifth and seventh of single eggs. The non-laying periods lasted 5, 5, 4, 6, 7, 5 days. (This arrangement gives a slightly misleading impression; for instance, there were 4 non-laying days between June 13 and 18 on which the bird did not lay, but the interval between egg-laying, which oc-

curred very early each morning, is 5 days, corresponding to the minimum reported for other passerines.)

It is surprising to note the length of the laying periods, for in all but those with single eggs, there were gaps of 1 or 2 days. It sometimes happens with other passerines that a day will be skipped, especially in unfavorable weather.

Evidence from these 4 observers shows that Cowbirds lay in clutches, 1, 2, 3, and, exceptionally, 7 in a season. (The 1 report to the contrary comes from a letter of F. L. Rand of St. Louis, Mo. to the U. S. Biological Survey in 1921, quoted by Friedmann (1929:184), telling of a hand-raised bird that laid 13 eggs in 14 days. I can find no information as to Mr. Rand's standing as an ornithologist and it is impossible to judge of the reliability of his statement.) The interval is 5 to 8 days, perhaps sometimes longer. They may lay at daily intervals, or may skip 1 or 2 days in depositing a clutch, depending somewhat perhaps on the availability of nests. Clutches probably usually consist of 4 or 5 eggs, but Walkinshaw's bird near the end of a long season had clutches of 1 and 6 eggs. As to the total number of eggs laid, this ranges from 4 and 5 with 2 of Friedmann's birds to the 25 of Walkinshaw's. It may well be that ordinarily they lay between 12 and 15 eggs.

Does a parasitic bird adjust the number of eggs laid to the opportunities presented? Chance (1940) found this to be true with the European Cuckoo (*Cuculus canorus*) by regulating the supply of Meadow Pipit (*Anthus pratensis*) nests available to the bird he watched for 5 seasons. The year when the supply was cut short she laid 15 eggs starting May 12 and ending June 13, while in the 2 years (the Cuckoo's third and fifth seasons) when Chance continually broke up Pipit nests, she laid 21 eggs from May 13 to June 27 and 25 eggs from May 11 to June 29. Cuckoos do not lay in clutches, but in a series, laying every other day, and when a regular supply of hosts is offered they lay practically continuously.

With the Cowbird, phenomenally bad weather cut off the nest supply for Friedmann's birds. As to Walkinshaw's female, it is a little hard to understand her unabated zeal for Field Sparrow nests. Usually in this area the Field Sparrow deserts when parasitized by a Cowbird. It might be thought that this response had worked as had Chance's deliberate collecting of Pipit's eggs and that the Cowbird was unduly stimulated by a continuous supply of building Sparrows. A study of the record, however, shows that this happened only with one pair, where the Cowbird laid in one nest July 8, in the substitute (and empty) nest about July 10 and in the third nest July 14.

SUMMARY

Four observers have found that 4 species of Cowbirds lay in clutches and that the intervals between clutches last from 5 to 8 days and possibly longer. Eggs may be laid at daily intervals or 1 or 2 days may be skipped.

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